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which there have been great depositions are in isostatic equilibrium. We, therefore, must conclude that the mountains have been maintained for long ages at approximately the same elevation by an undertow of material toward them, while the areas of deposition maintain their depth in spite of the added material by a sinking due to the undertow from the crust under such areas. Consequently, the continent may be considered as not being leveled off as a result of erosion, but as kept at approximately the same general elevation.

While an isostatic adjustment by means of a transposition of material may account for the normal condition under the areas of erosion and deposition, it does not account for the great elevation, into mountains and plateaus, of rock which was once under the ocean. Evidently there must have been a change in the density, under such areas, and an expansion of the materials in the earth's crust to the extent indicated by the height of the topography above the sea. This change was not due to a mere expansion from change of temperature, as a bar would expand. The expansion of the crust must have been due to chemical or physical changes which made the elements present form compounds with densities differing from what they had been previously. What could cause such rearrangement as to change the density by several parts in one hundred is a problem for the geophysicist and geologist.

The fact that material which was once under the sea now forms a mountain range seems to disprove the "root of the mountain" theory of compensation. It is difficult or impossible to see how the crust with its surface at or below sea level (supposedly in isostatic equilibrium) could, in addition to expanding to form the mountains, also decrease its density in that portion far below the average depth of com-

pensation (122 kilometers). As a matter of fact, the deflections and the gravity observations indicate that the compensation is not deep down in the crust, but in general within the depth stated above.

The movements noted in the exposed earth's materials have been slow and were in most cases due to stress differences which were below the rupturing point of the rock. There has been much slow yielding, without fracture, to long-continued stress differences. The isostatic adjustment of the earth's materials in the upper crust after or during erosion might cause many of the movements that have been recorded in the strata.

In conclusion, the immediate work which the geodesists should perform is to reduce all the existing gravity stations of the world by the same method which should be based on a rational theory of isostasy. As opportunity permits, a gravimetric survey should be extended to new regions and especially to oceanic islands. And as soon as an apparatus is designed which may be used successfully on a vessel, an extensive gravimetric survey of the oceans should follow.

WILLIAM BOWIE

U. S. COAST AND GEODETIC SURVEY

SAFEGUARDING THE HEALTH OF COLLEGE STUDENTS¹

ATTENTION has frequently been called to the fact that many educational institutions fail to make adequate provision for safeguarding the health of their students. These criticisms find expression most often in connection with the report of the injury or death of a student who has been allowed to participate in athletics without proper medical supervision; or when some serious sanitary fault causes, or contributes to, an epidemic among the stu-

¹ Based upon paper presented at Fourth International Congress on School of Hygiene, Buffalo, 1913.

dents; or there is unfavorable comment when some promising young student breaks down in course or shortly after graduation as a result of overwork or bad hygienic habits.

Many cases even more deserving of unfavorable criticism in which the student suffers avoidable physical damage and loss of time and money never come to light. These may be due to physical tendencies and handicaps that should have been discovered and warned against on examination, or to sicknesses that could have been avoided by better sanitation and control of living conditions. Four years of life in a college or university should mean for the average boy or girl a distinct gain in physical efficiency and in habits of sane, hygienic living instead of the opposite of these things, as is too often the case.

It is of course true that to-day nearly every institution of college rank is trying to make, or intends to make, some provision for protecting and promoting the health of its students. There has been a very marked change for the better in this respect during the past few years, and a wider recognition of the practical importance of measures that tend to keep the student in good health. Too often, however, the provision made consists merely of a gymnasium and facilities for competitive athletics, the use of which as well as the time and energy of the teachers are mainly limited to that small percentage of the student body who are candidates for the teams; and in connection with which there is no well-considered plan for bringing these and other agencies in the institution into a harmonious relationship for effective work in promoting health and efficiency.

It is not probable that any system of health supervision, however carefully devised and administered, can entirely prevent the occurrence of sickness or accident among the students. There can be no question, however, that much more should be done than is being done or even considered, in the majority of colleges and universities in the country, to limit the amount of preventable sickness and to increase the working efficiency of the students; nor can there be any question of the real and perma-

nent value of such preventive and educational work for both the individual and the community of which he becomes a part. The formulation of an adequate plan for health supervision must be based upon a consideration of the factors affecting student health in the college community. Such a study will suggest the division of these factors into two groups. In the first group will fall those factors that may be classed as "environmental," *e. g.*,

1. General sanitary condition of the neighborhood such as drainage, sewage disposal, breeding places for flies and mosquitoes.

2. Food and water supply in commons and boarding houses.

3. Sanitary conditions of rooms in dormitories and lodging houses as regards baths, toilets, janitor service and general surroundings.

4. Provision for advice and treatment in dispensary or infirmary in case of sickness.

5. Opportunities for exercise and recreation.

The second group will include the "individual factors," such as:

1. Physical characteristics and tendencies to weakness.

2. Knowledge and practise of the essentials of personal hygiene.

3. Habits of exercise and recreation.

This grouping serves at Princeton University as a logical basis for the division of responsibility for the supervision of student health between two closely allied bodies: The sanitary committee and the department of hygiene and physical education.

The sanitary committee is composed of six men appointed from the board of trustees and the university faculty, one of whom is a member of the department of hygiene and physical education. It has the responsibility for the administration of those factors which I have called "environmental." It maintains a close supervision over the administration of the commons and the infirmary; it employs the university physician, and has periodical inspections made of those lodging and boarding houses used by students for whom—about 15 per cent.—there is at present no provision on

the campus. It is also advisory to the board of trustees on such questions as:

1. Plans for modern sewage disposal plant.
2. The installation of a milk-pasteurizing plant in the commons.
3. Plans for a new infirmary, and a study of the sanitary features of plans for new buildings.

The administration of the second group of factors, those relating to the individual himself, falls to the department of hygiene and physical education. This department is organized and equipped to fulfill the following functions:

1. To conduct a regular academic course in hygiene, which is required of all freshmen one hour a week throughout the year.
2. To make thorough medical examination of all freshman at the beginning and the end of the year, and of all candidates for competitive teams at the beginning of each season, or more frequently in special cases.
3. To conduct classes in physical education, which is required of all freshmen three periods a week throughout the year.
4. To provide opportunities for exercise and the necessary instructions in voluntary work by upper classmen.
5. To encourage participation in intramural games and competitions by those who are not candidates for the regular university teams.
6. To stimulate the development of habits of hygienic living and of outdoor exercise and recreation among the whole student body.

Since the health interests of the university are closely bound up with those of the town, a natural and harmonious relationship has grown up between these two parts of the community for the promotion of the interests of general health. The active bodies in this work are the university sanitary committee and the borough board of health with its health officer. This board is composed of seven men, three of whom are members of the university. The president of the board is also chairman of the university sanitary committee, thus providing an opportunity for the closest cooperation between the two bodies. The effectiveness of this relationship is shown in the measures

that are put in force by joint action to improve the sanitary conditions in the community at commencement time, when there are many reunion headquarters temporarily established throughout the town; and at the time of the big games when there is an influx of from 20,000 to 30,000 people with the consequent strain upon sanitary provisions. The university contributes towards the salary of the health officer, so his services are available, under the direction of the sanitary committee, for the inspection of boarding and lodging houses occupied by students; for the periodical examination of the milk supplied to the commons and of the water in the university swimming pool; and for the technical supervision of the sanitary condition of grounds and buildings. The close relationship existing among these three bodies, the board of health, the sanitary committee, and the department of hygiene, makes possible an effective cooperation which results in an economical and efficient administration of the health problems of the entire community.

A university in a small town like Princeton which has a population aside from the university community of about 5,000 presents a simple problem from the point of view of health protection as compared with an institution located in a large city. It may be impossible to work out such an organization as this that we have been considering in every college town; but the general principle of establishing some comprehensive and effective plan of health administration should be put into effect in every large institution. A brief discussion of some of the essential phases of the plan as outlined may be of use in giving a clearer view of the work.

The supervision of the Princeton University infirmary is a function of the sanitary committee. The infirmary is in charge of an infirmarian, who is assisted by the necessary nursing and housekeeping force. The building contains fifteen beds and was built nearly twenty years ago. An isolation ward of about the same size was added later. A well-equipped dispensary adds greatly to the usefulness of the infirmary. Plans for a new in-

firmare are practically completed, as the present building is sometimes taxed to its utmost. The university physician is employed by the sanitary committee and attends the infirmary three hours daily, during the early morning and the late afternoon. Students are admitted upon his certificate and attended by him. A student may be attended by a physician from the town who is approved by the sanitary committee; and physicians and surgeons may be called in consultation if necessary.

Students are charged \$7 a year infirmary fees, which cover all necessary expenses during their stay in the infirmary. In contagious cases, or cases requiring special nursing the expense of the additional nurse is charged to the student. As board bills are charged to all students on their regular term bills the infirmary is credited with the amount of board the student would ordinarily pay during such time he may be confined to the infirmary. During the past year there were 400 bed cases, and about 4,500 dispensary calls. These figures may seem large for a student body of only 1,500, but much of the service in the dispensary, and even among the bed cases is in a measure preventive. For example, a boy with an incipient cold may be put to bed over Saturday and Sunday, and so a more serious illness and a further loss of time prevented.

In case a student is confined to his room by sickness that fact is reported to the college office before 10:30 by the janitor or the lodging house mistress, together with a statement whether or not a physician has been called. This early report gives an opportunity for word to be sent to the university physician, so that he can visit the student before noon if he has not secured medical attendance. No sick student is allowed to remain in his room in a dormitory more than a day. He is promptly taken to the infirmary, where he is given medical attention and nurses' care.

The inspection of the lodging and boarding houses is done regularly and a report is made on a form provided for the purpose. The points investigated include among others a statement as to the kind of house, the kind of room, the provisions for heating, lighting

and ventilation, the bath-room provisions, and the general character and tone of the place and people. In the case of boarding houses additional information is gained regarding the sanitary conditions of the dining-room, the kitchen, the refrigerator, care in garbage disposal, and notes on the general surroundings, such as the proximity of stables, chicken yards, exposed garbage, etc. Repeated inspections are made at irregular intervals during the year. Any defects are reported to the secretary of the sanitary committee who serves notice upon the owners of the premises. If the recommendations are not complied with promptly, the students are ordered out of the premises. The knowledge that such action will be taken by the university authorities and the fact that all payments for board and rent are made through the university treasurer's office, have had the effect of forcing the owners to keep the premises in proper condition.

A comprehensive physical examination is conducted by the department of hygiene and physical education. Special emphasis is laid upon the determination of the functional condition of the eyes, ears, nose, throat and the vital organs. The information so obtained serves as a basis for advice as to special exercises if needed. Advantage is taken of the opportunity to discuss with each individual the various practises and habits that affect his mental and physical efficiency. A follow-up scheme has been devised which makes it possible to keep in touch with special cases at regular intervals during the year and to cases referred to the home physician.

The course in personal hygiene deals with the fundamentals of health and physical efficiency; the influence of diet, exercise, bathing, etc.; the effects of personal habits, as the use of tobacco and alcohol; sex hygiene; and a study of the more common infectious diseases, their nature, cause, methods of transmission and prevention. Emphasis is laid upon the practical points of daily life, upon inducing the students to adopt a hygienic method of living, and upon the fact that health is in a very large measure subject to control.

A good deal of emphasis is placed upon the effort to promote the formation of habits of outdoor exercise and recreation among the upper classmen. This is done by organizing classes for voluntary work in various branches of physical education and by encouraging the organization of teams for athletic competition. In the development of these intra-mural athletic activities, advantage is taken of every natural student division as a basis for the organization of teams, with the result that there were during the past year 145 organized teams playing regular schedules for the championships of various groups; and throughout the year there were more than 1,300 men, counting the duplications on various teams during the different seasons, and not counting those who were on the various varsity squads, who took part in these contests. Competitions were conducted in swimming, water polo, relay racing, rowing, basket ball and baseball. The above statement does not include the large number of students who take part in individual contests in boxing, wrestling, tennis, golf and swimming.

This plan of guarding and promoting student health has been developed under the stimulus of the conviction that an educational institution has a real responsibility for the physical welfare of its students; that health is an educational factor of prime importance; that a student not entirely well is working under a handicap and is lowering the efficiency of the institution; and that a healthy body is one of the first essentials of clear thinking, clean living and efficient citizenship.

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THE GOVERNMENT OF LEARNED SOCIETIES

IN connection with the work of a committee of the American Psychological Association I wrote a year ago to the secretaries of all the "learned societies" listed in the *World Almanac* asking how their officers were elected and whether the method was satisfactory. With very great courtesy almost every secretary answered my first question (though one or two

copies of constitutions failed to reach me), and most of them answered the second. The result is that I find myself with an amount of material which it seems well worth while to put together in print.

The sixty-eight "learned societies" here listed can be divided according to their method of electing officers into some nine groups, as follows.

Group A.—In the following associations officers are elected by the governing board.

American Academy of Political and Social Science. Officers are elected by (9) directors, one third of whom are elected annually to serve three years.

American Antiquarian Society.

American Association for the Advancement of Science. Officers are elected from fellows by general committee, which consists of council plus one fellow or member elected by each section. Council consists of certain present and past officers, fellows elected by sections and affiliated societies, and nine fellows elected by the council. Permanent secretary, secretaries of sections and treasurer hold office for five years.

Archæological Institute of America. Officers are elected by council, which is composed of general officers and delegates from local affiliated societies. Executive committee is partly ex-officio, partly elected by council at annual meeting.

American Numismatic Society. Council elects officers. Members of council are nominated from the floor and elected by ballot.

National Association for the Study and Prevention of Tuberculosis. Officers are elected annually by board of sixty directors on nomination of committee appointed by chair. One fifth of directors are elected at each annual meeting.

National Geographic Society. Managers elect officers. Eight of the twenty-four managers are elected at each annual meeting to serve three years. A majority of the votes cast is necessary for election.

New York Zoological Society. Officers and executive committee are elected by managers. Executive committee appoints a nominating